## INTRODUCTION

The Telecommunications Act of 1996 imposes obligations on local exchange carriers (LECs) to offer their services for resale, to sell their network components on an unbundled basis, and to provide interconnection for other telecommunications carriers. The method that state public utilities commissions use to price those mandatory transactions, if the incumbent LEC cannot reach a voluntarily negotiated price with the prospective entrant, has great implications for economic welfare. In that respect, any guidance that the Commission can offer on the question of fair and efficient wholesale pricing under sections 251 and 252 of the new legislation will have a direct and material impact on the public interest. Additionally, an ill-conceived pricing method for transactions that the FCC or a state compels an incumbent LEC to undertake can effect an uncompensated confiscation of private property in violation of the Fifth Amendment of the U.S. Constitution and similar provisions found in state constitutions. The constitutional restrictions on takings therefore impose a floor on the price that regulators may set for mandated network access.

Prices for wholesale and network services should be efficient and compensatory. They should provide incentives for efficient entry and compensate incumbents for their economic costs. The efficient component-pricing rule (ECPR) provides prices that satisfy those two essential criteria. Departure from prices based on economic costs will interfere with economic incentives in local exchange markets and lead to economic inefficiency. To implement efficient and compensatory pricing it is necessary to examine empirically the market conditions in the local exchange.

In Part I, we explain the ECPR and show why it would serve economic efficiency and the public interest for the Commission and the state public utilities commissions to adopt the rule for pricing interconnection, unbundled network elements, and resale. We then use 1995 data from Florida to demonstrate the computation of access prices under the ECPR. We identify four means by which competing carriers may enter the local market.

In Part II we use data from California to provide an empirical assessment of competition in local exchange telephony just before Congress enacted the Telecommunications Act of 1996. That snapshot view of competition is critical, for much of the rhetoric surrounding the new legislation presupposes that *it* will unleash competition in local telephony. In fact, as the data from California show, the current level of actual and imminent entry into local telecommunications markets is substantial. The data on existing facilities establish that any barriers to entry into the local exchange are not restrictive and very surmountable. The interconnection, unbundling, and resale provisions of the new legislation can be expected to accelerate that pace of entry. Competition between telecommunications carriers will lead to marketing efficiencies and technological change that should reduce the costs of local telecommunications. These benefits of competition can be achieved given properly chosen price regulations.

In Part III we respond to the Commission's concerns about the ECPR in light of the empirical analysis. We show that the Commission's concerns about the pricing methodology based on economic costs are misplaced given market conditions in the local exchange, the flexibility of the pricing rule, and the incentives that the pricing system provides for competitive pricing by both incumbents and entrants. We show that the rule promotes dynamic efficiency while taking account of the significant joint and common costs of the LECs. The pricing method can be made operational using price caps. Cost and market data allow calculation of opportunity costs (as the FCC has recognized elsewhere with regard to cable).

## I. THE EFFICIENT COMPONENT-PRICING RULE: EMPIRICAL EVIDENCE FROM FLORIDA

The efficient component-pricing rule (ECPR) states that the price of an input should equal its average-incremental cost, including all pertinent incremental opportunity costs.[1] If the firm produces the input for its own use as well as for sale to competitors, it should charge competitors the direct incremental cost of providing the input plus the opportunity cost of the input. If the firm charges a constant per-unit price for the input (as opposed to a multipart or nonlinear tariff), the ECPR is calculated as follows:

> Efficient component price = the input's direct per unit incremental cost plus the opportunity cost to the input supplier of the sale of a unit of input

The ECPR principle—also known as the *imputation requirement*, the *principle of competitive equality*, or the *parity principle*—is merely a variant of elementary principles for efficient pricing. The opportunity cost of the input is the incumbent's forgone earnings. *With market alternatives, the ECPR price exactly equals the market price,* because the firm's opportunity cost is then the market price minus the firm's incremental cost. Thus, with competitive alternatives, the ECPR tracks market prices as they decline with competition.

We begin in the following sections by explaining the economic reasoning underlying the ECPR. Then, using actual data submitted by GTE Florida Incorporated (GTEFL) in 1995 to the Florida Public Service Commission in Docket No. 950984-TP, we employ the ECPR to calculate the appropriate prices for wholesale and unbundled network services. Our empirical analysis examines the following hypotheses:

> *Hypothesis 1:* There are significant joint and common costs among network elements, such that pricing the wholesale and unbundled services at or near long-run incremental costs will fail to meet the statutory requirement that rates be just and reasonable and, in the case of unbundled elements, will exclude the reasonable profit allowed by statute.
>
> *Hypothesis 2:* Opportunity cost as applied in the efficient component pricing rule is measurable with reference to regulated retail rates and market prices.
>
> *Hypothesis 3:* There will be stranded costs if the prices of wholesale and unbundled services are set to long-run incremental costs plus opportunity costs.

### A. *The Logic of the ECPR*

ECPR is a flexible and dynamic pricing system. To achieve the benefits of competition, pricing of resale and unbundled services using ECPR essentially involves setting price caps. Competition from entrants reselling LEC services will create downward pressure on retail prices as well as wholesale prices. The ECPR adjusts downward because avoided retail costs are subtracted from the *market* retail price. In addition, competition from entrants offering their own retail services, and providing facilities-based services will create pressure on retail prices, wholesale prices, and unbundled services. The LEC will have strong economic incentives to adjust its wholesale prices and prices for unbundled services downward to meet the competition so as to avoid losing sales. Thus,

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1. WILLIAM J. BAUMOL & J. GREGORY SIDAK, TOWARD COMPETITION IN LOCAL TELEPHONY 93–116 (MIT Press & AEI Press 1994); William J. Baumol & J. Gregory Sidak, *The Pricing of Inputs Sold to Competitors*, 11 YALE J. ON REG. 171 (1994); *see also* WILLIAM J. BAUMOL & J. GREGORY SIDAK, TRANSMISSION PRICING AND STRANDED COSTS IN THE ELECTRIC POWER INDUSTRY 115–38 (AEI Press 1995).

ECPR responds flexibly to competition and is consistent with decreasing market prices. Moreover, the falling prices result in the LEC *not recovering fully its regulated costs, resulting in stranded costs.*

We now address the calculation in the initial ECPR price caps. To see the rationale underlying the ECPR, consider an incumbent local exchange carrier that employs an input (generically called "access") to provide a retail service. The retail service has a regulated price of $10.00 per unit. The incumbent LEC incurs two costs in providing that service: "access," which has an incremental cost of $3.00 per unit, and "transport," which has an incremental cost of $2.00 per unit. Thus, the regulated price provides a contribution to joint and common costs equal to $5.00 per unit (that is, $10.00 - $3.00 - $2.00) The services offered by any competitive firm must yield revenues that cover each service's incremental cost. The total revenues must cover incremental costs as well as joint and common costs for the firm to remain viable.

The ECPR was designed to answer the following question: How should "access" be priced to a competitor that can provide its own transport and then compete for the retail customers of the regulated firm? It is assumed that service quality is the same, regardless of which firm provides the retail service. Therefore, the pricing rule should satisfy (at a minimum) two requirements: (1) that the flow of contribution from the retail service in question to joint and common costs is maintained; and (2) that the incumbent is displaced if and only if the entrant has a lower transport cost than does the incumbent.

The regulated rate structure contains cross subsidies as required by state regulatory commissions. This means that some services do not cover their incremental costs. Thus, it falls on other services to cover joint and common costs as well as the subsidies to those services. Until and unless rates are rebalanced, the revenues from some services must not only recover joint and common costs but also their contributions to cross subsidies. ECPR does not preserve cross subsidies, it merely preserves contributions. As a consequence, ECPR is consistent with rate rebalancing.

Here one must define the concept of *opportunity costs*. The term opportunity cost represents the difference between what an economic resource is earning in its current use and the most that it could earn elsewhere. For example, if Mr. Smith is earning $20,000 per year as an artist but could earn up to $100,000 per year as an accountant, his opportunity cost of being an artist is $80,000 per year.

In the above example, if a unit of access were not sold to the competitor, it could be used for the incumbent LEC's retail service and generate a contribution of $5.00. Certainly, part of the access price to the competitor should include the incumbent LEC's opportunity cost. If the access price excludes the incumbent LEC's opportunity cost, then the LEC will be unable to maintain the same flow of contribution from that particular retail service to joint and common costs. The other necessary component of the access price is the $3.00 incremental cost to the incumbent LEC of providing the access service. Thus, if the incumbent LEC charges $8.00 per unit of access, two results will obtain. First, the incumbent LEC will cover its direct costs of production. Second, the overall level of contribution will be the same regardless of whether the incumbent LEC or its rival provides the retail service.

## B. *The "Bottom Up" and "Top Down" Approaches to Administering the ECPR*

There are two ways to calculate the ECPR. In the example above we have formulated the simplest version of the ECPR:

> Efficient component price = the incumbent's incremental cost of "access" per unit *plus* the incumbent's opportunity cost of providing the unbundled input.

In the example, the ECPR produces a price equal to $3.00 plus $5.00, or $8.00 per unit. That method of calculating the ECPR price is called the "bottom up" approach to administering the ECPR.

In the simple benchmark case there is another approach to computing the ECPR that yields the equivalent result. One can obtain the same $8.00 input price by starting with the retail price of $10.00 and subtracting the avoided cost of "transport." That procedure, called the "top down" approach, is summarized as follows:

Efficient component price = retail price *less* avoided cost.

This second way to compute the ECPR corresponds precisely to the method that Congress prescribed in section 252(d)(3) for calculating wholesale rates.[2]

One can demonstrate that the ECPR satisfies the two pricing requirements discussed above—namely, that the ECPR will maintain the flow of contribution from the retail service in question to joint and common costs and that the rule will displace the incumbent LEC if and only if the entrant has a lower transport cost than does the incumbent. Suppose that an entrant were to buy one unit of access at the ECPR price. What would happen? Assume first that the entrant has the same transport cost as the incumbent LEC—that is, $2.00. If it combines that transport cost with the ECPR access price of $8.00, the entrant can maintain a retail price of $10.00, which is just the initial regulated rate. Therefore, if the entrant has the same transport cost as the incumbent LEC, the ECPR puts it on equal terms with the incumbent LEC at the regulated retail price.

Suppose now that the entrant has a *lower* transport cost than the incumbent LEC—say, $1.00 per unit, as compared with the incumbent LEC's $2.00 unit cost. In that case, the entrant can purchase access at the ECPR price and set a retail price of only $9.00 per unit. That retail price will bid customers away from the incumbent LEC; but, by pricing access at the ECPR price, the incumbent LEC obtains $8.00 per unit. Subtracting the incremental cost of access of $3.00 per unit, the incumbent LEC is able to maintain the same $5.00 level of contribution as if it had not lost any retail business to the entrant.

Finally, if the entrant's transport cost are greater than that of the incumbent LEC—say, $3 per unit—then it could not profitably enter. That would be the efficient outcome.

In sum, the ECPR achieves two remarkable results that advance the welfare of consumers. First, regardless of the entrant's success in the retail market, the rule ensures that the purchase of inputs by competitors will not affect the flow of contribution to the incumbent LEC's joint and common costs. Second, the rule ensures that inefficient alternative exchange carriers cannot profitably enter the market.

## C. *Empirical Analysis*

We will now demonstrate how regulators would use the ECPR to calculate actual prices for mandatory network access. Our empirical analysis is based on data submitted by GTEFL in 1995 to the Florida Public Service Commission in Docket No. 950984. Specifically, we investigate empirical issues related to the pricing provisions of wholesale and unbundled network services.

Our analysis of unbundled services considers issues related to the provision of unbundled loops and ports. A *loop* is a transmission path from a subscriber's station to a switching center (such as a LEC's central office) or a message or packet distribution point. An unbundled *port* provides switching services and call routing on the trunk side of the switch. A *switch* is a device that makes, breaks, and changes the connections among circuits so as to route calls on the network. A *trunk* is a telephone circuit with a switch at both ends. Access to unbundled ports allows alternative exchange carriers to provide vertical features in addition to basic service.

### 1. *Hypothesis 1: The Local Exchange Network is Characterized by Significant Joint and Common Costs*

We begin our analysis by examining the hypothesis that the local exchange network is characterized by significant joint and common costs, such that pricing wholesale and unbundled services at or near long-run incremental costs will fail to meet the statutory requirement that rates be just and reasonable and, in the case of unbundled elements, will exclude the reasonable profit allowed by statute.

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2. "For the purposes of section 251(c)(4), a State commission shall determine wholesale rates on the basis of retail rates charged to subscribers for the telecommunications service requested, excluding the portion thereof attributable to any marketing, billing, collection, and other costs that will be avoided by the local exchange carrier." 47 U.S.C. § 252(d)(3).

To test Hypothesis 1 we examine data on GTEFL revenues and costs by major product category. The five product categories included in our analysis are local service (residence, business, and other), local toll, switched access, special access, and "other." Since GTEFL is a regulated multiproduct firm there are four relevant cost components: long-run incremental costs for particular services, joint or shared costs, common costs, and "residual" costs. We define *long-run incremental costs (LRIC)* to equal the difference in the firm's total costs with and without the provision of a particular service, such as residential local service. A firm's *joint* (or *shared*) costs are those costs incurred in the provision of two or more services (but not the collection of all the firm's services) that are not incremental to any individual service. That is, joint or shared costs are caused by the provision of a group of services and, therefore, can be avoided only by ceasing the provision of all the services in that group. A firm's *common* (or *overhead*) costs are those costs incurred in the provision of all the firm's services that are neither incremental to any individual service nor joint or shared by any group of services. Hence, the firm can avoid common or overhead costs only by shutting down its entire operation. Finally, a regulated multiproduct firm may have *residual* costs caused, for example, by assets that remain on its books even though they have no economic value. If an asset is depreciated on the firm's books more slowly than its economic depreciation, it will remain as a cost even though it cannot produce any positive cash flow.

Each of those four types of costs necessarily includes a cost for the *return on invested capital.* For example, the LRIC of a service must include a return on capital sufficient to keep those resources in their current employment. If the return on capital invested to provide a service is below the *competitive* or *fair rate of return*, then the capital market will operate to move those investments to other projects that will yield (at least) a competitive return.

A firm earns a "reasonable profit"—or, equivalently, may be said to have been allowed to charge a price that is "just and reasonable" to its shareholders—when its *economic profits* equal zero. Economic profits are zero when total revenues equal total costs, including a competitive return on capital.[3] An incumbent LEC's return on capital equals the sum of the return on capital for the four cost components described above. Section 252(d)(1) requires that the rates that an incumbent LEC charges for unbundled network elements be "just and reasonable" and "may include a reasonable profit."[4] Those provisions do not exist merely to protect the rival carrier against the possibility that the incumbent LEC might try to charge an unreasonably high price for network access and thus reap unreasonably high profits. Section 252(d)(1) also protects the incumbent LEC against the possibility that the regulator would order the firm to sell its unbundled network elements at unreasonably low prices that would deny the LEC any opportunity to earn a reasonable profit. In short, the proper economic interpretation of the statute's provision for "reasonable profit" is that the incumbent LEC must be allowed to set rates for

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3. The description of zero economic profits in a competitive market can be found in any introductory textbook in economics, *e.g.*, JOSEPH E. STIGLITZ, ECONOMICS at 356-358 (W.W. Norton & Co. 1993), and is emulated in regulatory economics:

> One . . . feature of perfect competition contributing to its acceptance by noneconomists as a regulatory guide is the profit level implied by equilibrium in a perfectly competitive market. As is emphasized in every economics textbook, in such an equilibrium the firm is condemned to earn (no more than) zero economic profit, and it can only attain this level of profit—that is, it can avoid outright loss—by achieving perfect efficiency in its operation and by charging prices sufficiently low to avoid driving its customers into the arms of its rivals. The zero-economic-profit requirement is not so draconian as it sounds, because it is defined to include gross earnings sufficient to pay interest to those who have lent funds to the firm and to provide a return to equity holders that is consistent with the prevailing level of interest payments, after adjusting for differences in the risk of debt and equity. Nevertheless, this level of earnings permitted by competitive-market forces limits earnings to what is called the cost of capital, or to what regulators traditionally have called a "fair rate of return." In other words, besides serving as an instrument for attaining economic efficiency, perfect competition promises fairness by its preclusion of profits that might be deemed excessive. This guarantee of fairness, then, is another reason for the widespread acceptance of the competitive-market standard for regulation.

BAUMOL & SIDAK, TOWARD COMPETITION IN LOCAL TELEPHONY, *supra* note 1, at 30 (citing 1 ALFRED E. KAHN, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS 42–45 (MIT Press rev. ed. 1988)).

4. 47 U.S.C. § 252(d)(1).

unbundled elements that enable the firm to earn, on average, zero economic profits. Of course, random market factors may cause the incumbent LEC's profits to exceed or fall below that value in any particular period; but on average, over time, correctly determined regulated prices under section 252(d)(1) will yield zero economic profits.

Table I-1 presents GTEFL's actual revenues by class of service for calendar year 1995. The table also presents GTEFL's long-run incremental costs and contribution by service category. (Contribution is defined as the difference between GTEFL's revenues and long-run incremental costs.) Under traditional rate-of-return regulation, contribution equals joint and common costs, inclusive of the return on capital. Thus, it is possible to approximate GTEFL's joint and common costs by subtracting long-run incremental costs from total revenue. Since most price-cap models specify limits on the firm's allowed rate of return, that approximation also holds for incumbent LECs subject to price-cap regulation.

TABLE I-1RECOVERY OF JOINT AND COMMON COSTS
(MILLIONS OF DOLLARS)

| | Revenue[1] | LRIC[2] | *Contribution* |
|---|---|---|---|
| *Local* | | | |
| *Residence* | *247.9* | [redacted] | [redacted] |
| *Business* | *247.8* | [redacted] | [redacted] |
| *Other* | *189.9* | [redacted] | [redacted] |
| *Total Local* | *685.7* | [redacted] | [redacted] |
| *IntraLATA Toll* | *62.8* | [redacted] | [redacted] |
| *Switched Access* | *329.5* | [redacted] | [redacted] |
| *Special Access* | *74.5* | [redacted] | [redacted] |
| *Other* | *116.5* | [redacted] | [redacted] |
| *Total* | *1,269.0* | [redacted] | [redacted] |

*Notes:*
[1] *1995 actual revenues, as reported in GTE's Revenue Outlook by Line of Entity.*
[2] GTEFL's estimates of long-run incremental cost.

The data presented in Table I-1 allows us to accept the hypothesis that the local exchange market is characterized by significant joint and common costs. In 1995, GTEFL's total long-run incremental costs were approximately $[redacted] million. GTEFL's annual revenues, however, were approximately $1,269 million. That disparity implies that, if an incumbent LEC's rates for wholesale and unbundled network services were set equal to LRIC, the regulator would deny the LEC the opportunity to generate revenue sufficient to meet the "reasonable profit" criterion in section 252(d)(1). That confirms the widely held view in the economics literature that a multiproduct firm cannot set individual product prices equal to long-run incremental costs and remain solvent. The presence of joint, common, and residual costs necessarily implies that the sum of the firm's incremental costs is less than its total costs.[5]

5. Some may dispute this fundamental implication of economic theory and maintain that, because the LRIC for a service includes the cost of capital, pricing at LRIC provide the incumbent LEC "reasonable profit." That reasoning is specious, however. The firm could not recover its total costs by setting prices equal to LRIC: It would necessarily earn negative economic profits, an outcome that could not be interpreted as "just" or "reasonable" under any standard. Moreover, the cost of capital embodied in a service's LRIC is only the cost of capital *specific to that marginal investment*. It does not include the cost of capital for investment in joint and common facilities, nor does it include the resource cost of those facilities.

Moreover, if regulators order that mandatory network access be priced at LRIC, then more disaggregated levels of unbundling can only reduce the incumbent LEC's ability to recover joint and common costs. As the degree of unbundling rises, the sum of all the LRIC measures for unbundled network elements will fall as a percentage of the incumbent LEC's total costs. Unbundling will thus cause a increasing share of the incumbent LEC's total costs to appear to be unattributable to any given network element. Due to the importance of sunk costs, that phenomenon is likely to be especially pronounced with regard to the unbundling of network elements that consist primarily of intellectual property and information-based assets, such as signalling software and data bases.

In short, the nature of costs in a regulated multiproduct firm require that rates be set above LRIC. How then should joint, common, and residual costs be allocated to the individual services to achieve sufficient revenue for the firm to earn zero economic profit? The public interest demands that an efficient pricing method be used to establish the incumbent LEC's prices subject to the condition that it have an opportunity to recover its total costs. The method that achieves that objective is the efficient component-pricing rule, to which we now turn.

2. *Hypothesis 2: Opportunity Cost as Applied in the Efficient Component Pricing Rule is Measurable with Reference to Regulated Retail Rates and Market Prices.*

As noted above, under the ECPR an input price is set equal to its direct per unit incremental cost plus opportunity cost. In this section, we test the hypothesis that opportunity costs are measurable. Because opportunity costs are defined with reference to the best alternative, we begin our analysis by examining the options available to alternative local exchange carriers (ALECs) under the Telecommunications Act of 1996. The Act specifies that an incumbent LEC establish (1) wholesale prices for services sold at retail and (2) prices for interconnection and for unbundled network elements. Figure I-1 illustrates that ALECs can enter the local exchange market and provide basic, vertical, and local toll services in a variety of ways. An ALEC in Florida, for example, can do any of the following:

1. Construct its own loop and port facilities, and completely bypass GTEFL;

2. Construct its own loop facilities, and lease port facilities from GTEFL;

3. Lease loop facilities from GTEFL and self-provide port facilities;

4. Purchase basic, vertical, and toll services from GTEFL at resale;

5. Purchase basic and vertical services from GTEFL at resale and self-provide local toll service; and

6. Purchase a substitute loop service from GTEFL and self-provide port facilities. A substitute service purchased from GTEFL can be considered an "inside" option. An example of an "inside" option is GTEFL's two-wire private line service.

As of May 5, 1996, the Florida Commission certified 26 alternative local exchange carriers (See Table I-2). In light of the ALECs' options, we test the hypothesis that opportunity costs are measurable by applying the ECPR methodology to establish prices for wholesale and unbundled network service.

FIGURE I-1
OPTIONS AVAILABLE TO ALTERNATIVE LOCAL EXCHANGE CARRIERS

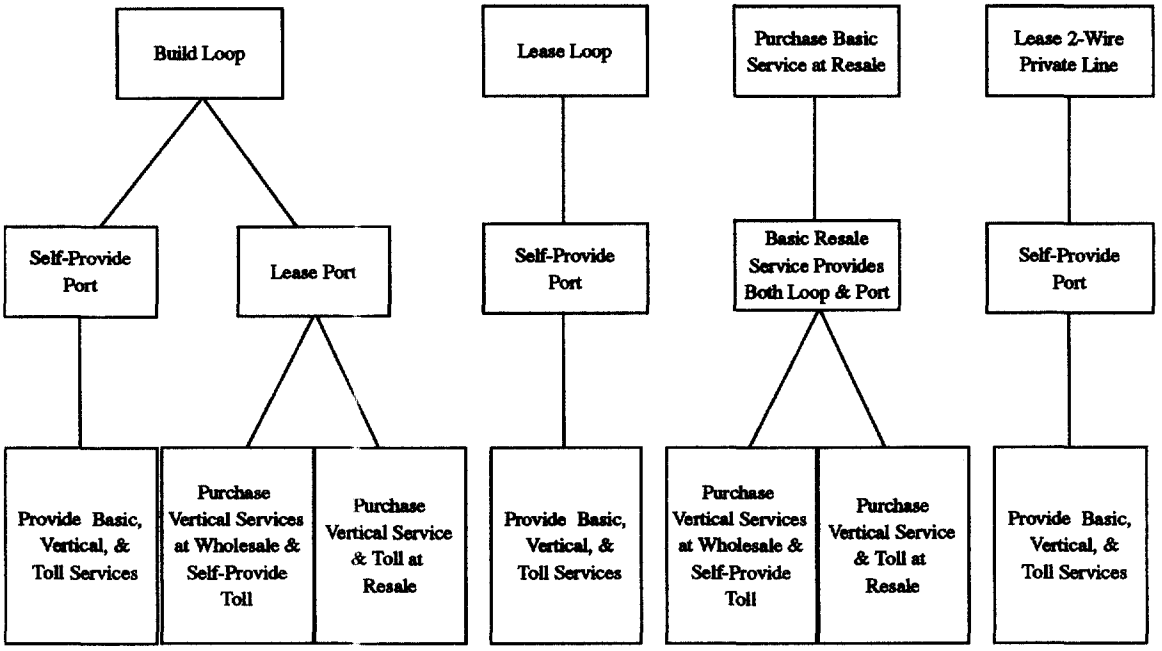

TABLE I-2CERTIFIED ALTERNATIVE LOCAL EXCHANGE CARRIERS

| Docket | Alternative Local Exchange Carriers | Agenda |
|---|---|---|
| 960181-TX | AT&T Communications of the Southern States, Inc., d/b/a | 04/04/96 |
| 960276-TX | BellSouth Telecommunications, Inc | 04/30/96 |
| 951014-TX | City of Lakeland | 09/12/95 |
| 950928-TX | Continental Fiber Technologies, Inc. | 09/12/95 |
| 951346-TL | Continental Florida Telecommunications, Inc | 02/06/96 |
| 951085-TX | Date and Electronic Services, Inc. | 10/10/95 |
| 950904-TX | Digital Media Partners | 09/12/95 |
| 960213-TX | Florida Public Telecommunications Association, Inc. | 04/30/96 |
| 960153-TX | Florida Telecommunications Services, Inc. | 04/04/96 |
| 960277-TX | Global Tel*Link Corporation | 04/30/96 |
| 950954-TX | Intermedia Communications of Florida, Inc | 09/12/95 |
| 951212-TX | Interprise-Continental Fiber Technologies Alternet Date | 11/21/95 |
| 960196-TX | Intetech, L.C. | 04/30/96 |
| 960187-TX | LCI International Telecom Corp | 04/04/96 |
| 950754-TX | MCI Metro Access Transmission Services, Inc. | 09/12/95 |
| 950759-TX | Metropolitan Fiber Systems of Florida, Inc. | 09/12/95 |
| 960197-TX | National Telecommunications of Florida, Inc. d/b/a NationalTel | 04/30/96 |
| 950878-TX | Payphone Consultants, Inc. | 11/21/95 |
| 951310-TX | Sprint Metropolitan Network, Inc. | 12/19/95 |
| 960122-TX | Strategic Technologies, Inc | 04/30/96 |
| 950755-TX | TCG America, Inc. | 09/26/95 |
| 951512-TX | Teleco Communications, LTD | 04/04/96 |
| 951358-TX | Telecommunications Service Center, Inc. | 02/06/96 |
| 960043-TX | Telenet of South Florida, Inc. | 03/19/96 |
| 950906-TX | Time Warner AxS of Florida, L.P. | 09/12/95 |
| 960110-TX | US West Interprise America, Inc., d/b/a Interprise America, | 04/04/96 |
| 950981-TA | Winstar Wireless of Florida (had been certified as Avant Garde Telecommunications of Florida, Inc., Docket No. 950998-TX)) | 09/12/95 |
| 960068-TX | Worldcom, Inc. D/b/a LDDS Worldcom | 03/19/96 |

As of May 5, 1996

a. *Calculation of Wholesale Prices*

In the application of the benchmark ECPR case to the establishment of wholesale prices, the "transport cost" in the previous example is simply interpreted as the avoided cost of offering the service at resale. In that setting the ECPR wholesale price becomes:

> wholesale price = retail price *less* avoided cost of resale

or equivalently,

> wholesale price = incumbent's incremental cost of providing the service for resale *plus* opportunity cost of resale.

We will now compute the actual wholesale prices that the ECPR would imply for GTEFL to charge ALECs in the Florida market.

Table I-3 presents the ECPR wholesale price for basic business service using data that GTEFL presented to the Florida Public Service Commission in 1995. Those data are characteristic of the type of information routinely presented to state public utility commissions. In this example, the wholesale price is calculated using the "top down" method. The first step in that process involves subtracting avoided costs from GTEFL's business rate.[6] Avoided costs are defined as avoided retailing costs less incremental wholesaling costs.

A further adjustment is required, however. As Figure I-1 indicates, ALECs can self-provide local toll service that they package with GTEFL's resold local services. When that combination of resale and self-provisioning occurs, GTEFL losses an important source of subsidy funds. As a practical matter, the likelihood of that form of competitive entry occurring is a near certainty because local exchange service and local toll service are purchased as a bundle by nearly all of GTEFL's residential and business customers. Thus, when an ALEC purchases GTEFL's local business service, that entrant will likely bundle that service with its own self-provided local toll service, thereby capturing a key source of GTEFL's subsidy funds. Thus, forgone contribution from the sale of local toll service is for GTEFL an opportunity cost of its selling basic business service at wholesale. That element of opportunity cost can be accurately measured using available billing and cost data. Because GTEFL receives revenues from the provision of originating and terminating switched access services when ALECs provide local toll services, the contribution from those access services must be taken into account. As shown in Table I-3, when the necessary calculations are performed, the resulting wholesale rate for basic business service is $[redacted].

Table I-4 presents the ECPR wholesale price for basic business service using the "bottom up" approach. That calculation begins with the incremental cost of providing the service at resale, and adds to that amount all pertinent opportunity costs. As Table I-3 indicates, the incremental cost of the resale of basic business service equals the long-run incremental cost of the service ($[redacted]) less avoided costs ($[redacted]), or $[redacted]. GTEFL's opportunity cost equals the average contribution per line ($[redacted]) plus the net contribution from local toll service ($[redacted]), or $[redacted]. The "bottom up" calculation produces a price equivalent to that generated from the "top down" method, or $[redacted].

Tables I-5 and I-6 provide similar calculations for single-line residential (1FR) service. The examination of that service offering reveals that 1FR service is priced below its long-run incremental costs: The retail rate for 1FR service equals $10.85 per line per month, while the long-run incremental cost for that service is $[redacted] per line. Thus, as shown in Table I-5, GTEFL's opportunity cost of 1FR service, inclusive of toll contribution, is negative.

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6. This rate is an average of GTEFL's single-line measured service (1MB), single-line flat service (1FR), and PBX rates.

TABLE I-3
NUMERICAL EXAMPLE: "TOP DOWN" APPROACH
CALCULATION OF THE WHOLESALE RATE FOR BASIC BUSINESS SERVICE
(DOLLARS PER LINE PER MONTH)

| | |
|---|---|
| Retail Rate | $[redacted] |
| *less* | |
| Avoided cost[1] | $[redacted] |
| *plus* | |
| Forgone toll contribution[2] | $[redacted] |
| *less* | |
| IntraLATA access contribution[3] | $[redacted] |
| *equals* | |
| Wholesale Rate | $[redacted] |

Notes:
[1] Avoided cost equals avoided retailing cost less incremental wholesaling cost.
[2] Forgone toll contribution equals average toll revenue ($[redacted]) less incremental cost of toll ($[redacted]).
[3] IntraLATA access contribution equals intraLATA access revenue ($[redacted]) less incremental cost of access ($[redacted]).

TABLE I-4
NUMERICAL EXAMPLE: "BOTTOM UP" APPROACH
CALCULATION OF WHOLESALE RATE FOR BASIC BUSINESS SERVICE
(DOLLARS PER LINE PER MONTH)

| | |
|---|---|
| Network LRIC[1] | $[redacted] |
| *plus* | |
| Opportunity Cost[2] | $[redacted] |
| *total* | $[redacted] |

Notes:
[1] Network LRIC equals LRIC for service ($[redacted]) *less* avoided cost ($[redacted]).
[2] Opportunity cost equals contribution per line ($[redacted]) *plus* net contribution from intraLATA toll service ($[redacted]).

TABLE I-5
NUMERICAL EXAMPLE: "TOP DOWN" APPROACH
CALCULATION OF THE WHOLESALE RATE FOR
SINGLE-LINE RESIDENTIAL (1FR) SERVICE
(DOLLARS PER LINE PER MONTH)

| | |
|---|---|
| Retail 1FR Rate | $[redacted] |
| *less* | |
| Avoided cost[1] | $[redacted] |
| *plus* | |
| Forgone toll contribution[2] | $[redacted] |
| *less* | |
| IntraLATA access contribution[3] | $[redacted] |
| *equals* | |
| 1FR Wholesale Rate | $[redacted] |

Notes:
[1] Avoided cost equals avoided retailing cost less incremental wholesaling cost.
[2] Forgone toll contribution equals average toll revenue ($[redacted]) less incremental cost of toll ($[redacted]).
[3] IntraLATA access contribution equals intraLATA access revenue ($[redacted]) less incremental cost of access ($[redacted]).

TABLE I-6
NUMERICAL EXAMPLE: "BOTTOM UP" APPROACH
CALCULATION OF WHOLESALE RATE FOR
SINGLE LINE RESIDENTIAL (1FR) SERVICE
(DOLLARS PER LINE PER MONTH)

| | |
|---|---|
| Network LRIC 1FR[1] | $[redacted] |
| *plus* | |
| Opportunity Cost[2] | $[redacted] |
| *total* | $[redacted] |

Notes:
[1] Network TSLRIC for 1FR equals LRIC 1FR ($[redacted]) *less* avoided cost ($[redacted]).
[2] Opportunity cost equals contribution per 1FR line ($[redacted]) *plus* net contribution from intraLATA toll service ($[redacted]).

b. *Calculation of Unbundled Loop Prices*

Unbundled loop prices can be established using the "bottom up" ECPR method. Recall that in the "bottom up" method, the unbundled price equals the sum of the firm's long-run incremental costs of the service provided plus opportunity cost. In the standard ECPR formula, opportunity cost is defined with reference to the current retail price and is equal to the contribution forgone when entry occurs. As Figure I-1 shows, however, GTEFL's provision of unbundled network services will cause it to lose contributions from local exchange services, vertical features, and local toll services. That outcome can be distinguished from the provision of wholesale services in which forgone contribution was limited to local toll.

Using the ECPR, prices for unbundled loops and ports must together recover GTEFL's opportunity costs. Therefore, opportunity cost must be allocated to loops and ports. Because ports can be purchased at competitive prices from third-party vendors, it follows that ALECs will have a strong incentive to self-provide ports if GTEFL's port price exceeds the purchase, installation, and operating costs of self-supplied facilities. Thus, the allocation of opportunity costs to ports equals the difference between (1) ALEC's cost of self-providing ports and (2) GTEFL's LRIC for port services. The remaining opportunity costs resulting from GTEFL's provision of unbundled services is, therefore, assigned to loops. Table I-7 presents the unbundled loop rate when opportunity costs are defined as the forgone contribution embodied in GTEFL's retail rates. In our example, opportunity cost equals $[redacted], and the unbundled loop price equals $[redacted]. We refer to the loop price calculated in that manner as the "upper bound" loop price: That price is conditional on ALECs not being able to self-supply loop facilities or purchase substitute services from GTEFL at lower rates, an unrealistic assumption. When market alternatives are present, the observed market price can be used as a yardstick for calculating opportunity cost.

Table I-8 presents the unbundled loop price calculation based on the average residential customer. The "upper bound" loop price is $[redacted] per line per month. Opportunity cost measured with reference to GTEFL's retail rates equals $[redacted].

TABLE I-7
NUMERICAL EXAMPLE: UNBUNDLED LOOP RATE
CALCULATION BASED ON AVERAGE BUSINESS CUSTOMER
(DOLLARS PER LINE PER MONTH)

| | Revenue | LRIC[1] | Contribution |
|---|---|---|---|
| Basic Retail Service | 35.46 | [redacted] | [redacted] |
| End-User Line Charge | 6.00 | [redacted] | [redacted] |
| Local Toll | 4.06 | [redacted] | [redacted] |
| Vertical Services | 1.12 | [redacted] | [redacted] |
| Switched Access | | | |
| Interstate | | | |
| CCLC[2] | 4.83 | [redacted] | [redacted] |
| Other | 5.33 | [redacted] | [redacted] |
| Intrastate | 8.11 | [redacted] | [redacted] |
| Total | 64.91 | [redacted] | [redacted] |

Notes:
[1] Long-Run Incremental Cost.
[2] Common Carrier Line Charge.
Source: Florida Public Service Commission, Docket No. 950984-TP.

| | |
|---|---|
| "Upper Bound" Loop Price | |
| Unbundled Loop LRIC | [redacted] |
| *plus* | |
| Incremental Marketing Costs | [redacted] |
| *plus* | |
| Opportunity Costs (forgone contribution) | [redacted] |
| *total* | [redacted] |

TABLE I-8
NUMERICAL EXAMPLE: UNBUNDLED LOOP RATE
CALCULATION BASED ON AVERAGE RESIDENTIAL CUSTOMER
(DOLLARS PER LINE PER MONTH)

| | Revenue | LRIC[1] | Contribution |
|---|---|---|---|
| Retail 1FR | 10.85 | [redacted] | [redacted] |
| End-User Line Charge | 3.50 | [redacted] | [redacted] |
| Local Toll | 1.83 | [redacted] | [redacted] |
| Vertical Services | 2.35 | [redacted] | [redacted] |
| Switched Access | | | |
| Interstate | | | |
| CCLC[2] | 3.37 | [redacted] | [redacted] |
| Other | 3.71 | [redacted] | [redacted] |
| Intrastate | 5.66 | [redacted] | [redacted] |
| Total | 31.27 | [redacted] | [redacted] |

Notes:
[1] Long-Run Incremental Cost.
[2] Common Carrier Line Charge.
Source: Florida Public Service Commission, Docket No. 950984-TP.

| | |
|---|---|
| "Upper Bound" Loop Price | |
| Unbundled Loop TSLRIC[1] | [redacted] |
| *plus* | |
| Incremental Marketing Costs | [redacted] |
| *plus* | |
| Opportunity Costs (forgone contribution) | [redacted] |
| *total* | [redacted] |

If an entrant's stand-alone cost of loop facilities were less than the "upper bound" prices of $[redacted] and $[redacted] that the ECPR would produce in the above examples, then the relevant opportunity cost would equal the difference between the entrant's stand-alone costs and GTEFL's incremental cost of loop service. That is, in the presence of facilities-based competition, the ECPR implies that GTEFL's loop price should equal its long-run incremental cost for loop service plus opportunity cost as constrained by the market.

In addition, to building its own loops, an ALEC may have other available substitutes to GTEFL's loop facilities. As outlined above, an ALEC could acquire basic services at wholesale, which includes the services of both a loop an a port; alternatively, an ALEC could purchase two-wire private line service from GTEFL at a retail rate. If either of those two services has a price lower than GTEFL's "upper bound" loop price, then the ALEC will choose to purchase the lowest-price alternative. In that case, one can readily measure opportunity cost with reference to the best alterative.

In sum, using data on revenues and costs routinely submitted in regulatory proceedings, we accept the hypothesis that opportunity costs are measurable. Opportunity costs can be accurately calculated with reference to the regulated rate structure to derive "upper bound" prices for wholesale and unbundled services. When market alternatives are present, observed market prices can be used to calculate opportunity costs and the correct access prices implied by the ECPR.

### 3. *Hypothesis 3: There Will Be Stranded Costs If the Prices of Wholesale and Unbundled Services Are Set Equal to Long-Run Incremental Costs plus Opportunity Costs*

The preceding discussion illustrates that the ECPR is compensatory in the sense that it covers the incumbent carrier's direct economic costs and opportunity costs. The pricing rule is not *fully* compensatory, however. The presence of facilities-based entry, and the possibility that entrants may purchase services under existing retail rate structures that are substitutes for the incumbent LEC's unbundled services, reduce the likelihood that the incumbent LEC will be able to recover its total costs. In this section, we examine the hypothesis that there will be stranded costs even if prices are set equal to long-run incremental cost plus opportunity costs.

We examine that hypothesis using the data on opportunity costs presented above. Recall that opportunity costs were calculated with reference to the regulated rate structure. That exercise produced "upper bound" loop prices. Those prices need not be sustainable, however. For example, most retail rate structures are based on systemwide measures of cost. If costs vary regionally, then geographic subsidies may exist. Unbundling is inconsistent with the presence of cross subsidies across classes of services and geographic areas. Thus, the incumbent carrier must be given the flexibility to reduce its price to meet the price of the best alternative. When that meeting of competition occurs, some costs will be stranded.

Again using Florida data, we can evaluate the hypothesis that costs will be stranded even when regulators use the ECPR to price wholesale services and unbundled network elements. GTEFL's current two-wire private line rate is $23.00 per month. If private line service is a good substitute for GTEFL's unbundled loops, then the presence of the private line rate constrains GTEFL's ability to establish loop prices that maintain full contribution. Thus, GTEFL will incur stranded costs. Estimates of GTEFL's stranded costs are shown in Table I-9 and Figure I-2 for different hypothetical levels of lost customer lines. The calculations assume that GTEFL leases loop facilities at its two-wire private line rate, or $23.00. Our calculations show that if GTEFL leases 10 percent of its current residential and business line to ALECs, it will incur stranded costs in Florida of $[redacted] million annually. It bears emphasis that the stranded cost estimates presented here are conservative: They are based on statewide average costs and assume that entrants target customers that provide GTEFL "average" contribution. It is far more likely, of course, that entrants will target high-margin areas and high-margin customers.

TABLE I-9
STRANDED COSTS WHEN UNBUNDLED LOOP
PRICES ARE SET EQUAL TO LONG RUN
INCREMENTAL COSTS PLUS OPPORTUNITY COSTS
(MILLIONS OF DOLLARS)

| Lost Customer Lines | Residential | Business | Total |
|---|---|---|---|
| 5 Percent | [redacted] | [redacted] | [redacted] |
| 10 Percent | [redacted] | [redacted] | [redacted] |
| 15 Percent | [redacted] | [redacted] | [redacted] |
| 20 Percent | [redacted] | [redacted] | [redacted] |
| 25 Percent | [redacted] | [redacted] | [redacted] |
| 30 Percent | [redacted] | [redacted] | [redacted] |

FIGURE I-2
STRANDED COSTS WHEN UNBUNDLED LOOP
PRICES ARE SET EQUAL TO LONG RUN
INCREMENTAL COSTS PLUS OPPORTUNITY COSTS

In sum, based on the available empirical evidence, we accept the hypothesis that there will be stranded costs if the prices of wholesale and unbundled services are set equal to long-run incremental costs plus opportunity costs. That result will obtain because competition will drive down the price of network access implied by the ECPR. The fall in the ECPR prices provides useful guidance on how to set end-user charges to achieve recovery of stranded costs. The end-user charge should equal the difference between the incumbent LEC's net revenues obtained using the "upper bound" price (that is, the ECPR price based on the LEC's regulated rate structure) and its net revenues obtained from the lower ECPR price that takes into account the alternatives available to entrants. If regulators failed to put such a system of end-user charges in place, they would condemn the incumbent LEC to earn negative economic profits, which would be neither "just" nor "reasonable" under any standard. To understand empirically how likely it is that competition will drive down ECPR prices, we now consider the extent of competition in California. California is chosen to illustrate the extent of competition because one of the authors of this study, Daniel F. Spulber, assembled data describing that market in prior research.

## II. AN EMPIRICAL ASSESSMENT OF COMPETITION IN THE LOCAL EXCHANGE: EVIDENCE FROM CALIFORNIA

Pricing using the ECPR method, incremental plus opportunity costs, adjusts to competition in two important ways. First, the basic pricing formula adjusts downward with competition because the opportunity-cost component falls. Second, the initial prices for network services are generally implemented in the form of price caps, which allows them to adjust downward as competition develops.

The basic formula for retail pricing suggests that the wholesale price should be equal to the retail price minus avoided incremental retail costs. The ECPR method allows price adjustment because *as the retail price falls due to competition in resale, the wholesale price should fall as well.*

The basic approach to pricing unbundled network services is for downward pricing flexibility -- that is, the pricing of network elements such as loops adjusts downward to equal the price of the best alternative. This neither subsidizes nor discourages competitive alternatives. Instead, it accurately reflects the market price of capacity and therefore conveys an accurate signal about the relative scarcity of capacity.

Competition ensures that rates will fall. The formulas automatically adjust downward to reflect falling prices in the market. Thus, the wholesale price for services falls because it equals the retail price minus avoided incremental costs. The price for unbundled network elements falls because the opportunity cost of facilities declines as alternative facilities become available.

Some have suggested that concerns about continued monopoly in the local exchange and about the vigor of existing and potential competition require prices for resale and network services to "jump start" competition. Such subsidies to entrants and underpricing of access are not necessary or appropriate given the significant actual and potential competition in local exchange telecommunications and given the size and resources of the actual and imminent entrants.

### A. *Resale and Facilities-Based Competition*

The assertion that retail prices will fall requires entry of competing carriers that will resell the services of incumbent local exchange carriers. The applications for entry of many companies as resellers, including major interexchange carriers, demonstrates the strength of competition without construction of additional facilities.

With unbundling of network services, resellers will play an important potential role in the telecommunications marketplace. Resale of local service provides a means for rapid entry into local exchange competition without the "set-up" costs of entry. Resellers can compete effectively with facilities-based carriers through product and service bundles that provide customer convenience, marketing and sales expenditures, and competitive pricing.

Resale competition promises to be the most vigorous form of competition in the near term. Following similar patterns established in natural gas wholesale markets and taking shape in wholesale electric power markets, marketers, brokers, and resellers compete with the *merchant functions* of facilities-based utilities.[1] In a petition for local exchange service authority filed in California, AT&T has sought permission to provide such service on both a resale and facilities basis. AT&T's strategy in California

> will emphasize resale as "the most immediate way to get into the market" there. But it will also will look for ways to combine its existing "network elements" in the state with facilities obtained from other companies. With modification, AT&T switching equipment could be used in combination with unbundled local loop facilities leased from others.[2]

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1. *See* Michael J. Doane & Daniel F. Spulber, *Open Access and the Evolution of the U.S. Spot Market for Natural Gas*, 37 J. OF LAW & ECON. (Oct. 1994).
2. TELECOMMUNICATIONS REPORTS, (Sept. 11, 1995).

MCImetro requests both facilities-based and resale authority in California and plans eventually to offer a "full range" of services, including local dial-tone service, to both residential and business customers. MCImetro already is providing interstate access and intrastate high-speed data services, using facilities acquired from the former Western Union Access Transmission Services.[3] MCImetro plans to deploy switching equipment initially in Los Angeles, San Francisco, San Diego, and Sacramento, and then to offer services throughout the state.[4]

We will examine the following hypotheses using data from California. Observations in other states such as Florida are comparable.

> *Hypothesis 1:* A significant number of companies are already seeking licenses to enter the local exchange telecommunications market as resellers.

> *Hypothesis 2:* A significant number of companies are already seeking licenses to enter the local exchange telecommunications market by providing facilities-based competition.

Table II-1 presents the Alternative Local Exchange Carriers (ALECs) petitions received by the California Public Utilities Commission (CPUC) by September 1, 1995 and indicates whether they propose to provide facilities-based or resale services or both.[5] The data establish that 63 companies are requesting authority from the CPUC to enter as resellers and that 57 companies are requesting authority from the CPUC to enter as facilities-based competitors. Therefore, we accept the hypotheses that significant numbers of companies are already proposing to enter the market as resellers or as facilities-based carriers, or as both.

Table II-2 gives a breakdown of the petitions for resale and facilities-based service in terms of the type of company applying to provide competitive service. Companies seeking to enter the local exchange as resellers and facilities-based carriers include Competitive Access Providers (CAPs), cable companies, wireless providers, and shared tenant service providers

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3. This is according to William Harrelson, Senior Counsel for MCI Telecommunications Corp.'s Western Region operations, as reported in TELECOMMUNICATIONS REPORTS (Sept. 4, 1995).

4. *Id.* Mr. Harrelson states that "[i]t makes sense to start where the demand is likely to be the largest at first."

5. Facilities-based competition with those two LEC carriers began Jan. 1, 1996; bundled resale-based competition began March 1, 1996. The CPUC asked ALEC providers to submit applications by Sept. 1, 1995 for authority to compete against Pacific Bell and GTEC in the state's local exchange markets. *See* TELECOMMUNICATIONS REPORTS (Jul. 31, 1995).

TABLE II-1
COMPANIES REQUESTING ALEC AUTHORITY

| # | Company | Proposed Service Offered | |
|---|---|---|---|
| | | Facilities-Based | Resale |
| 1 | Adnet Telemanagement | | X |
| 2 | Addtel Communications | | X |
| 3 | Advantage Communications | X | X |
| 4 | AT&T | X | X |
| 5 | AWM Messaging* | | X |
| 6 | Bakersfield Cellular | X | X |
| 7 | Bittel | | X |
| 8 | Brooks Fiber of Bakersfield | X | X |
| 9 | Brooks Fiber of Fresno | X | X |
| 10 | Brooks Fiber of Sacramento | X | X |
| 11 | Brooks Fiber of San Jose | X | X |
| 12 | Brooks Fiber of Stockton | X | X |
| 13 | Business Discount Plan* | | X |
| 14 | Cable & Wireless | | X |
| 15 | Cable Plus Company* | X | |
| 16 | CalTech International Telecom | | X |
| 17 | Caribbean Telephone & Telegraph | X | X |
| 18 | Cellular 2000 | X | X |
| 19 | Century Telecommunications | X | X |
| 20 | Communication Telesystems International | X | X |
| 21 | Continental Telecommunications of California | X | X |
| 22 | Dial & Save of California | | X |
| 23 | Electric Lightwave | X | X |
| 24 | Extelcom* | | X |
| 25 | Fiber Data Systems | X | X |
| 26 | Fibernet | | X |
| 27 | Genesis Communications | | X |
| 28 | GST Lightwave | X | X |
| 29 | GST Pacific Lightwave | X | X |
| 30 | GTE California | X | X |
| 31 | GTE Card Services | | X |
| 32 | GTE Intelligent Network Services | X | |
| 33 | GTE Mobilnet | | X |
| 34 | IGC Access Services | X | X |
| 35 | Info-Tech Communications | X | X |
| 36 | LCI International Telecom | | X |
| 37 | L.D. Services | | X |
| 38 | Linkatel Pacific | X | X |

## TABLE II-1
## COMPANIES REQUESTING ALEC AUTHORITY
## (CONTINUED)

| # | Company | Proposed Service Offered | |
|---|---|---|---|
| | | Facilities-Based | Resale |
| 39 | Long Distance Charges | | X |
| 40 | Mammoth Cellular | X | X |
| 41 | MCI Metro Access Transmission | X | X |
| 42 | MFS Intelnet | X | X |
| 43 | Napa Valley Telecom* | | X |
| 44 | National Comtel Network | | X |
| 45 | Newtelco* | X | X |
| 46 | Nextlink of California | X | X |
| 47 | NucomNet | | X |
| 48 | Pacific Bell | X | X |
| 49 | Pac-West Telecom | X | X |
| 50 | Preferred Long Distance | | X |
| 51 | SLO Cellular | X | X |
| 52 | TCG Los Angeles* | X | X |
| 53 | TCG San Diego* | X | X |
| 54 | TCG San Francisco* | X | X |
| 55 | Telematic | | X |
| 56 | The Associated Group* | X | X |
| 57 | The Telephone Connection of Los Angeles | | X |
| 58 | Unitel | X | X |
| 59 | Universal Pacific Communications | | X |
| 60 | U.S. Long Distance | X | X |
| 61 | U.S. Voice Telemanagement | | X |
| 62 | Venture Technologies Group* | X | X |
| 63 | Viacom Communications | X | |
| 64 | Winstar Wireless of California | X | X |
| 65 | Working Assets Funding Service | | X |
| 66 | WorldCom* | | X |

Notes:
* The following companies do business as, or are subsidiaries of: AWM Messaging (d.b.a. Priority 1+ Long Distance); Business Discount Plan (d.b.a. L.D. Discount Plan); Cable Plus Co. (d.b.a. Telephone Plus); Extelcom (d.b.a. Express Tel); Napa Valley Telecom (d.b.a. Ameritel); Newtelco (d.b.a. The Sprint Telecommunications Venture); TCG Los Angeles, TCG San Diego, and TCG San Francisco (partially owned by TCI Communications (30%) and Cox Communications (30%)); The Associated Group (d.b.a. Associated Communications of Los Angeles); Venture Technologies Group (d.b.a. Allegro Communications); and WorldCom (formerly LDDS Communications, d.b.a. LDDS Worldcom).

Source: CPUC.

TABLE II-2
CLASSIFICATION OF THE 66 PETITIONERS

| Classification | Number |
|---|---|
| IECs (including CAPs) | 39 |
| IEC Application Pending | 5 |
| IEC/Cable Joint Venture | 1 |
| Cable Companies | 4 |
| Facilities-Based Cellular (CMRS) | 4 |
| Cellular Reseller | 1 |
| Shared Tenant Service Provider | 1 |
| LECs (Pacific Bell and GTEC) | 2 |
| Other | 9 |
| Total | 66 |

Source: CPUC.

*Hypothesis 3:* Companies seeking licenses to enter the local exchange telecommunications market as resellers and facilities-based carriers or both employ a diverse set of transmission technologies.

Table II-2 establishes that companies seeking to enter the local exchange as resellers and facilities-based carriers include CAPs, cable companies, wireless providers, and shared tenant service providers.

A review of the Certificate of Public Convenience and Necessity (CPCN) applications filed with the CPUC (D.95-07-054) shows that many applicants need little additional investment to begin providing local service. For example, US Long Distance, Inc., which intends to provide local exchange service in all areas of California, currently has four major switching facilities across the U.S., including one DEX 600 in downtown Los Angeles, and plans to lease additional facilities. In addition, a review of CPCN applications shows that many applicants intend to provide some of the following services: interconnection services, PBX trunks, Centrex, access to directory, operator service, intrastate toll, interstate long-distance, international long-distance, travel card services, conference calling, call blocking, inside wire arrangements, 800 service, 911 service, 411 service, White/Yellow pages listings, and analog DID.

The entry of many companies as resellers, including the major interexchange carriers, demonstrates the strength of competition without construction of additional facilities. Moreover, expansion of demand and the variety of communications services creates additional opportunities for competitive entry. The economic data on these segments for the California market clearly indicate the strength of actual and potential entry. Actual and projected entry into the local exchange strongly indicates that barriers to entry into local exchange telecommunications markets are far from prohibitive and that subsidizing the price of mandatory network access is not needed to assure competitive outcomes.

## B. *Strength of Competition in the Local Exchange*

The LECs *already* face facilities-based competition from a variety of companies employing diverse types of transmission technology including coaxial cable, fiber optics, and wireless. Customers are indifferent to the manner of transmission. They care only about the price and quality of the communication services, not how such services are delivered. Competition and capacity already in place counsel the FCC to base its pricing of

mandatory access to the incumbent LEC's network on the belief that barriers to entry do not prevent competition in local exchange telecommunications.

The entry that has already taken place and the additional entry that has been projected demonstrate a number of significant points.

> *Hypothesis 4:* Multiple technologies are economically viable, and many transmission technologies will play an important role in constructing competing networks.

The presence of multiple technologies for telecommunication transmission, ongoing technological change, and the interconnectivity of networks indicate that the technology of natural monopoly is no longer characteristic of the local exchange. The mobility of wireless services is an advantage over wireline systems. Moreover, digital technology will be used in personal communications services (PCS) transmission, and cellular providers are upgrading their analog transmission systems to improve transmission quality. *These technologies further serve to eliminate any potential for a local "bottleneck."*

Actual and potential entry into telecommunications using coaxial cable for telephony, fiber optic transmission, and wireless transmission including both cellular and PCS suggest the variety of technological solutions to providing telecommunications services. Technological change, particularly in wireless and fiber optics, has reduced the sunk cost requirements for constructing local exchange facilities.

> *Hypothesis 5:* Actual and projected entry strongly indicate that barriers to entry into California telecommunications markets are far from prohibitive.

The strongest evidence that barriers to entry are not substantial is the large installed capacity of competitors. Facilities-based competition is already in progress and continuing to expand. Such competition takes the form of cable telephony, fiber optics and competitive access providers, and wireless.

### 1. *Cable Telephony*

Cable technology and facilities should be considered in evaluating local exchange telecommunications competition. Most of the coaxial cable systems that deliver cable television are capable of delivering telephone and other telecommunications services as well.[6] About three quarters of national cable installations were capable of two-way communications by the end of 1992.[7] According to the National Cable Television Association (NCTA), "Coaxial cable's carrying capacity when no fiber is present in the network is about 900 times that of a phone company's line into the home. Furthermore, as fiber optics are added, a profound change occurs: the closer the fiber comes to the subscriber, the greater the capacity of that final coaxial 'drop' into the subscriber's home or business place."[8]

According to NCTA, "[T]he cable industry already has in place most of the plant and infrastructure to compete head-on with local telcos."[9] Cable systems already can reach over 90 million homes and most have already made much of the investment needed to deliver telephone and other telecommunications services.[10] California is closely in step with national cable television market penetration rates. In 1994, 64 percent of television households in California and 63 percent of television households in the U.S. subscribed to cable.[11]

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6. *See* SCIENTIFIC ATLANTA, COACCESS: CATV TELEPHONE SYSTEM: A DUAL-SERVICE TELEPHONY/VIDEO SYSTEM FOR CATV NETWORKS, (1993).

7. *See* NORTH AMERICAN TELECOMMUNICATIONS ASSOCIATION (NATA), 1993-1994 TELECOMMUNICATIONS MARKET REVIEW AND FORECAST 134 (1993).

8. NATIONAL CABLE TELEVISION ASSOCIATION (NCTA), CABLE TELEVISION AND AMERICA'S TELECOMMUNICATIONS INFRASTRUCTURE 7 (April 1993).

9. NORTH AMERICAN TELECOMMUNICATIONS ASSOCIATION (NATA), 1993-1994 TELECOMMUNICATIONS MARKET REVIEW AND FORECAST (1993).

10. The NCTA states that cable reaches 90 million homes and now passes 96% of all homes, NCTA, CABLE TELEVISION DEVELOPMENTS 1-A (Fall 1994).

11. In 1985, 43 percent of television households in California subscribed to cable; for the U.S. in aggregate, the figure was 46